



SIKA AT WORK

AIRCRAFT FACTORY IN CADIZ, SPAIN

SUSTAINABLE ROOFING SOLUTION

BUILDING TRUST



SIKA ROOFING SOLUTIONS

Sustainable Solutions measured by Life Cycle Assessment (LCA)

PROJECT DESCRIPTION

This project required the refurbishment of the roof system on an aircraft factory in Cadiz, Andalusia (ES). The project has a total area of 10,000 m² consisting of a wave-formed sandwich deck roof, with an insulation layer between two metal decks and no waterproofing. The customer was looking for a waterproofing solution with a good price/performance ratio.

PROJECT REQUIREMENT

The existing factory roof needed to be waterproofed and an increase in the energy efficiency of the building was also desirable. This would be achieved by applying a solar reflective coating to reduce the cooling costs of the factory, which with its location in the South of Spain had been quite high due to the air conditioning being used for almost six months per year. The building had also been suffering from water ingress, which was causing problems internally. Therefore the customer wanted a durable yet cost-effective waterproofing solution for the building's roof, which could be spray-applied and provide an effective watertightness.

SIKA'S SUSTAINABLE APPROACH

Sikalastic®-560 was specified for the project, which is a cold applied, one component waterborne liquid applied membrane that cures to provide guaranteed waterproof protection. The product is highly elastic, UV-resistant and can be spray-applied, allowing large areas to be coated in a short space of time. Sikalastic®-560 was specified in white because of its reflective properties, which would help reduce the building's cooling costs in this hot climate.

To evaluate and compare the specified Sikalastic®-560 with black colored bituminous solutions and solvent based polyurethane liquid membranes, which are the main competitive solutions typically applied in Spain, a Life Cycle Assessment (LCA) was used. The LCA is performed from cradle to gate for 10,000 m² for each roofing refurbishment solution, which means the LCA investigates the potential environmental impact of a product from raw material extraction and manufacturing, to the factory gate. The impacts of the components of the three roofing systems are calculated.

TECHNICAL SOLUTION:

- **Substrate:** Wavy metal deck
- **Primer:** Sikalastic® Metal Primer
- **Reinforcement:** Sika® Flexitape Heavy
- **Waterproofing:** Sikalastic®-560 White

To differentiate from bituminous solutions as well as from Solvent based PU system Sika's Product Sustainability Group performed a Life Cycle Assessment (LCA) of three roofing solutions:

- Specified Sika system build-up with Sikalastic®-560 white color membrane
- Similar system build-up with Solvent based white Polyurethane (PU) membrane
- Bituminous system, including primer and insulation needed to regularize the substrate



RESULTS OF THE LCA FOR THE PROJECT

For the roofing area, the Sikalastic®-560 system has a significantly lower impact when compared to both competitive solutions, bituminous system and solvent based PU liquid applied membranes. In terms of relevant environmental indicators such as Energy Footprint, Carbon Footprint and Summer Smog Potential, the Sikalastic®-560 system has a significantly lower environmental impact:

Impacts relative to Sikalastic® system (%):

	Bituminous System	Solvent based PU System
CO ₂ emissions (GWP)	+192	+67
Cumulative energy (CED)	+ 228	+48
Summer smog (POCP)	+ 113	+38

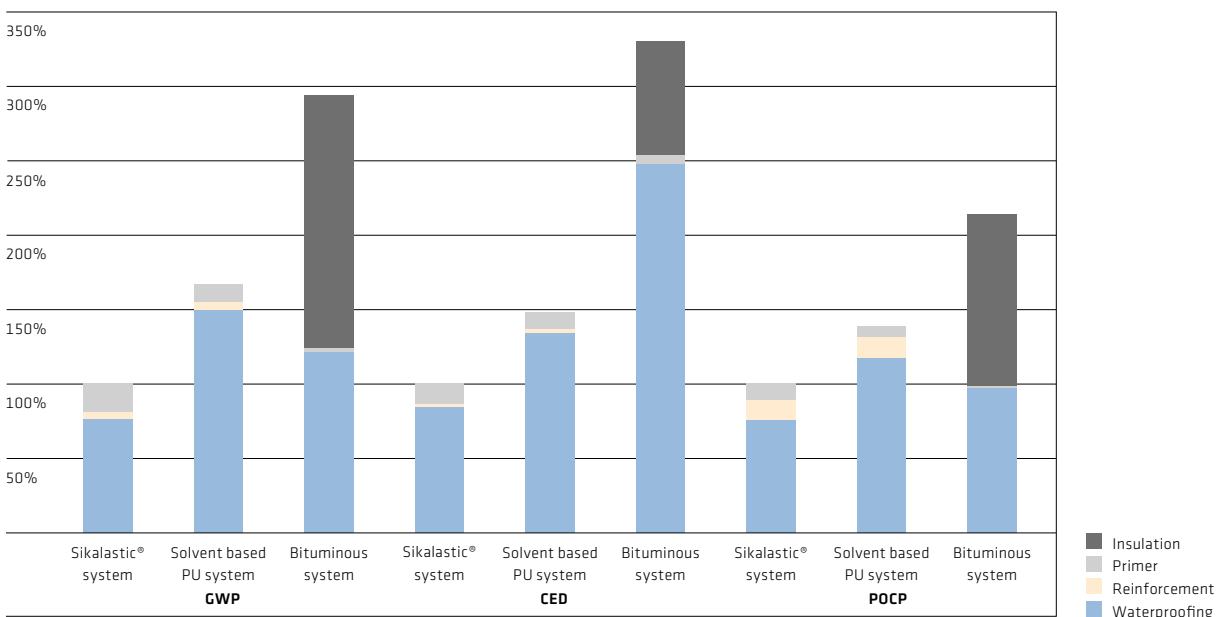
INVESTING IN SUSTAINABLE SOLUTIONS

Sikalastic®-560 is a versatile, ready to use liquid membrane, which can be applied directly onto a variety of different substrates and different geometries, with no need to install an additional substrate component (unlike the bituminous sheet solution). It can be easily applied in both new construction and refurbishment projects, allowing the extension of the lifetime of existing roofs. It is also available in light colors, like the white Sikalastic®-560 used in this project, with a Solar Reflective Index (SRI) of 102 which can enhance energy efficiency by reducing significantly cooling costs over time.

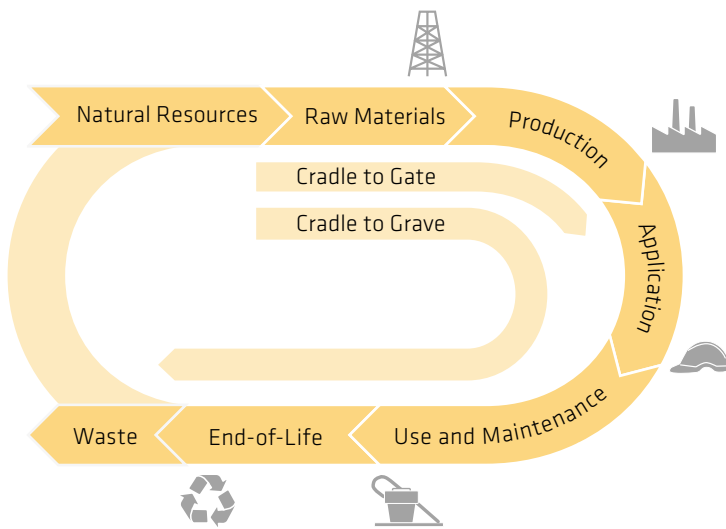
When compared to competitive solutions, it also performs better in terms of potential environmental impacts since it is a water based, low VOC solution and needs no insulation as substrate regulation. In addition, it is cold applied and requires no welding or heating with propane. Compared to bitumen, it brings at least a 50% reduction in the impacts assessed, and compared to the Polyurethane (PU) solvent based dispersion membrane it brings at least a 25% reduction in the impacts (Carbon Footprint, Energy Footprint and Summer Smog Potential).

The project allowed Sika to demonstrate its competence and expertise in sustainability, including all relevant quantitative contributions to a sustainable high performance tailor-made roofing solution to fulfill the customer requirements from a technical, economic and environmental point of view.

ENVIRONMENTAL IMPACTS FOR THE ROOFING SYSTEM [10,000 M²]



THE SIKA LIFE CYCLE ASSESSMENT (LCA) APPROACH



Life Cycle Assessment (LCA) is a standardized method to assess and compare the inputs, outputs and potential environmental impacts of products and services over their life cycle. LCA's are increasingly rec-

ognized as the best way to evaluate the sustainability performance of products and systems. The LCA can greatly assist our customers in evaluating Sika's products and systems namely by providing quantitative data on their environmental profile. This enables the differentiation of products that may have similar performance, but greater variations concerning their environmental impact - where obviously the lower, the better. Sika carries out LCA's according to the ISO 14040 series and the standard EN 15804. The impact assessment methodology used is CML 2001. The LCA results are presented for the following three relevant impact categories deemed most relevant for roofing systems:

- Global Warming Potential (GWP) [kg CO₂-eq.] ("Carbon Footprint") - is the potential contribution to climate change due to greenhouse gas emissions.
- Cumulative Energy Demand (CED) [MJ] ("Energy Footprint") - is the total amount of primary energy from renewable and non-renewable resources.
- Photochemical Ozone Creation Potential (POCP) [kg C₂H₄-eq.] ("Summer Smog") - is the formation of reactive chemical compounds, e.g., ozone, from direct sunlight on certain primary air pollutants, which may be harmful to human health, ecosystems and crops.

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



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